**2019 National All-Star Academic Tournament**

**Round 9 – Tossups**

1. In representation theory, these values are generalized by the weight of a representation. If *T* is an operator and *a* is a non-zero scalar, then either *T* minus *a* has a bounded inverse or *a* is one of these values, according to the Fredholm alternative. If a time-dependent operator is part of a Lax pair, then these values do not depend on time. In epidemiology, the basic reproduction number is the largest of these values of the NGM. The “power method” is one way of iteratively computing the “dominant” one of these values. The spectrum of an operator generalizes these values to infinite dimensional Hilbert spaces. If all of these scalars are distinct, then a matrix is necessarily diagonalizable. These scalars are the roots of the characteristic polynomial. For 10 points, name these scalars that are solutions to the equation “*A* *x* equals lambda *x*,” where *x* is an eigenvector.  
ANSWER: **eigenvalue**s [accept **spectrum** before mention]  
*<Science Math - French>*

2. One story describes these animals' “phosphorescent eyes” as “luminous, terrible sequins.” In that story, a jilted witch transforms an entire wedding party into these animals. In another story, villagers stone an old woman to death after a body part cut from one of these animals transforms into her amputated hand. A hunter seduces a young girl and then burns all her clothes in “The Company of [these animals],” one of three stories about these animals in *The Bloody Chamber*. The Carpathian nobles Ulrich von Gradwitz and Georg Znaeym realize that the “brave lads” that have come to rescue them are actually these animals at the end of Saki's *The Interlopers*. In a fairy tale, one of these animals justifies his abnormally large eyes with the explanation “All the better to see you with.” For 10 points, what kind of animal kills the Grandmother in “Little Red Riding Hood?”  
ANSWER: **wolves** [accept **werewolves**]  
*<Literature British Non-Shakespeare - French>*

3. A series by Wangechi Mutu depicts these body parts by pasting magazine cut-outs on top of medical textbooks' diagrams of uterine cancer. An abnormally small one of these body parts appears at the apex of a triangular form, to the *left* of the sun, in Tarsila do Amaral's *Abaporu*. These body parts are shaped like crescents in Wifredo Lam's *The Jungle*. Ancient Iberian sculpture inspired the flat, empty depiction of one of these body parts in a painting from near the end of Picasso's “Rose Period.” The second version of Henri Matisse's *The Young Sailor* was inspired by an artifact depicting one of these body parts that he saw at the Trocadero Museum. Apocryphally, Pablo Picasso stared at that artifact for five hours before repainting two of these body parts he depicted in *Les Demoiselles d'Avignon*. For 10 points, name these body parts that are often depicted stylistically in African masks.  
ANSWER: **head**s [or **face**s; accept **mask**s or **bust**s]  
*<Arts Painting - Myers>*

4. This organization employed “coffee sniffers” to enforce a ban enacted on the belief that drinking coffee compromised its members' effectiveness. It didn't involve galley slavery, but flight from this organization led Roma people to congregate in the “Outlaw Corridor”. This organization was famed for its great mobility, as expressed in events like the Great Sleigh Drive and its use of the Oblique Order of Battle. This organization briefly included a group of *lange kerls*, a special guard selected for their height. This organization's use of “needle guns” allowed it to triumph over more professionalized foes in the 1860s. This force was led by officers from the *junker* class and triumphed over its Austrian counterpart in the Seven Weeks' War. For 10 points, name this fighting force that won the battles of Königgratz and Sedan and was employed by kings including Frederick the Great.  
ANSWER: **Prussian Army** [accept Königlich **Preußische Armee**, **Prussian Military**; do NOT accept **German Army**, **Wehrmacht**]  
*<History European 1400-1914 - Myers>*

5. This collection uses a motif consisting of the four notes **(read slowly)** B-flat, E-flat, D, and B-flat in a movement which opens with a harp solo imitating Lumir. The third portion of this work depicts the murder of a drunk warrior after he frees Sarka from a tree. Giuseppe Cenci's *La Mantovana* is the basis for the theme of this work's second movement. The rising *allegro commodo, non agitato* theme **(read slowly)** B low E F-sharp G A B B B is played in that movement. This collection uses two flutes playing sixteenth notes to depict two sources of a river in a movement that supplies the melody of the Israeli national anthem, Hatikvah. “Ye Who Are Warriors of God,” a Hussite hymn, is quoted twice in this work. Parts of this work depict the Vyšehrad **(“VISH-eh-raht”)** castle and the Vltava **(vull-TAH-vah)** River. For 10 points, name this set of six tone poems including “The Moldau” by Bedrich Smetana.  
ANSWER: ***Ma vlast*** [or ***My Homeland***]  
*<Arts Music - Smith>*

6. The narrator of this work recalls a time when the crowd yelled with “hideous laughter” after he was tripped during a soccer game and the referee “looked the other way.” The narrator of this work believes that when a man like himself becomes a tyrant, he becomes “a hollow, posing dummy” and must do what his subjects expect of him. After seeing a dead man “grinning with an expression of unendurable agony,” the narrator of this work remarks, “Never tell me, by the way, that the dead look peaceful.” The narrator of this work tries to “avoid looking like a fool” when he is followed around by a crowd of two thousand people. A mahout who is twelve hours away from the central setting of this work is the only one who can tame an animal who has “gone must.” This essay's narrator performs the title action while serving as a police officer in Burma. A large animal is killed in, for 10 points, what essay by George Orwell?  
ANSWER: “**Shooting an Elephant**”  
*<Literature British Non-Shakespeare - McCullar>*

7. Linda Gordon wrote a book about the 1904 kidnapping of Irish orphans sent to this modern-day state to live with Mexican families in a mining town. This state was the site of a long running feud between cattlemen, the Tewksburys and Grahams. A confederate territory named for this state was dissolved after a neighboring state's Battle of Glorieta Pass. This modern-day state was the site of the Battle of Picacho Pass and the starting location of the “Long Walk” of the Navajo. This modern-day state was the setting of a gunfight between a gang which included the Clantons and a group which included the Earps and Doc Holliday. For 10 points, name this modern-day state that saw the shootout at the O.K. Corral in its town of Tombstone, and which along with New Mexico, gained more land in the Gadsden purchase.  
ANSWER: **Arizona**  
*<History American (1865-1945) - Hawkins>*

8. Nernst divided this quantity by the ratio of the frictional force and viscosity, which is reduced in cells by promoting glycogen synthesis. Copper ferrocyanide was precipitated into an earthenware container in one tool used to determine this quantity. Pfeffer cells are used to determine this quantity, whose difference is multiplied by the reflection coefficient in the Starling equation. Cations bound to plasma proteins may increase this quantity according to the Donnan effect. The difference in height in a U-shaped tube with dialysis tubing can be used to determine this quantity. This quantity is equal to the van't Hoff factor times molarity times the ideal gas constant times temperature. For 10 points, name this colligative property, symbolized pi, which is the force per unit area necessary to prevent the movement of water across a semipermeable membrane.  
ANSWER: **osmotic pressure** [prompt on pi or capital pi]  
*<Science Chemistry - Rao - Pothuraju>*

9. A song based on a part of the last chapter of this book is sung just before the Kiddush at the start of Shabbat in some Jewish homes. The fourth and fifth verses of the 26th chapter of this book seem to directly contradict each other. The first verse of one chapter of this book starts by acknowledging that it was copied down by the scribes of king Hezekiah **(“heh-zuh-KYE-ah”)**. 2 **(“second”)** Peter 2:22 quotes an aphorism originating from this book about a dog that eats its own vomit. The beginning portion of the last chapter of this book is attributed to King Lemuel of Massa as instructed to him by his mother. That chapter's ending portion speaks about a “woman of valor.” It's not Psalms, but this book also states that the “fear of God is the beginning of wisdom.” For 10 points, name this book found before Ecclesiastes in the Old Testament, which collects its namesake sayings.  
ANSWER: Book of **Proverbs** [or ***Míshlê***]  
*<RMP Christian/Bible Religion - Suh>*

10. One company in this industry scored a marketing coup when it drastically reduced the price of durian. That company's main rival in this industry has divisions such as “Glam” and “Massage”, which offer personal grooming services. Those two companies in this industry, Grab and Gojek, are rivals in most Southeast Asian markets. Didi Chuxing is China's dominant company in this industry. A nationwide strike in August 2018 in Spain protested a company in this industry, which used a software tool called “greyball” to screen for officials enforcing regulations on it. A May 8, 2019 strike targeted companies across this industry. This industry drew controversy after a contractor committed a mass shooting in Kalamazoo, Michigan. The CEO of one company in this industry, Travis Kalanick, resigned in 2017 after a series of scandals. For 10 points, name this industry that includes Lyft and Uber.  
ANSWER: **ridesharing** [accept word forms, **T**ransportation **N**etwork **C**ompanites, **ride-hailing**, **mobility** companies; prompt on taxi, technology, fintech, transportation, delivery]  
*<Current Events Non-US - Myers>*

11. This book cites verses from the Book of Luke about hating oneself and one's family in order to follow God, which it ties to a man attempting to avoid ridicule when building a tower to support one of its paradoxes. This book used Faust as an example of someone who preserves the universal by being hidden and silent. This book discusses the seduction of Agnes and it rejects an understanding of faith through meditation, instead basing faith upon passion. In its preface, this book's writer claims to be “nothing of a philosopher.” The anxiety faced by the Virgin Mary is discussed in a section of this book that asks if there is a teleological suspension of the ethical, an action which separates this book's tragic heroes and knights of faith. Published under the pseudonym Johannes De Silentio, for 10 points, name this book by Søren Kierkegaard about Abraham's sacrifice of Isaac.  
ANSWER: ***Fear and Trembling*** [or ***Frygt og Bæven***]  
*<RMP Philosophy/Thought - Lucas>*

12. A section of the poem “Pale Fire” quotes a line by this author after stating “And now what shall I do? My knight is pinned.” This author gave a Persian title and a title in his own language to each of the twelve books of his poem cycle inspired by reading Joseph Hammer-Purgstall's translation of Hafez. This author commanded “Tell me you stones, O speak, you towering palaces!” to open the first poem in a 24-poem cycle. In a poem by this author, a father tries to comfort his son by saying “the wind is sighing through dry leaves” and “it's a streak of fog” after that son sees a figure beside them “with crown and cape” who later kills him. This author of “Italian Journey,” *West-East Divan*, and *Roman Elegies* wrote a poem in which the title “elf-king” kills a boy. For 10 points, name this German author of *Der Erlkönig*, a major proponent of *Sturm und Drang*.  
ANSWER: Johann Wolfgang von **Goethe**  
*<Literature European - French>*

13. After a series of massacres in this country, soldiers gifted a basket of severed heads and roses to a duchess who had given them medical supplies. Marshal Hubert Lyautey became famous for counterinsurgency tactics he developed while fighting a war in this country. Damasio Berenguer used mustard gas during a war in this country after a defeat for his country, the Disaster at Annual. David Lloyd George's Mansion House Speech denounced German aggression in this country. The Algeciras Conference resolved one crisis named for this country, which began when Wilhelm II visited a port in this country and declared his support for its resistance to French domination. In one war in this country, a young Francisco Franco defeated Abd el-Krim. For 10 points, the Rif War took place when FmBerber tribes attempted to fend off Spanish colonialism in what country, also the location of the Tangier Crisis?  
ANSWER: Kingdom of **Morocco** [accept **Maroc**, **Marruecos**, al-**Maghrib**]  
*<History World - Singh>*

14. This figure founded a festival in which two young boys led a procession from the temple of Dionysus at Phaleron to the temple of Athena at Skiras to mark their transition to ephebes. After founding the Oschophoria, this figure carried out the synoikismos of Attica. Cimon found the bones of this figure on Skyros, where Lysippus killed him by pushing him off a cliff. Instead of choosing the safer sea route, this figure traveled along a route along the Saronic Gulf that passed six entrances to the Underworld. Medea tried to poison this figure who killed the bandits Sciron and Procrustes on his route from Troezen to Athens. This figure forgot to switch his ship's black sails, ultimately resulting in his father's death. Aegeus was the father of, for 10 points, what hero who slayed the Minotaur?  
ANSWER: **Theseus**  
*<RMP Greek/Roman Myth - Rao - Pothuraju>*

15. The most recent calibration curve used in this technique includes data from foraminifera and speleothems and is known as INTCAL13. Upwelling causes anomalously high results in this technique due to the marine reservoir effect. One standard used in this technique is a 1000 lb batch of oxalic acid created by NIST. A parameter required for this technique is often measured by passing samples through a linear accelerator and electromagnetic filters in accelerator mass spectrometry. Willard Libby discovered this technique whose namesake material is produced in the atmosphere when cosmic rays interact with nitrogen and has a half life of 5730 years. By using results from dendrochronology, the results of this technique can be assigned a calendar age. For 10 points, name this method of determining the age of an object using the amount of a certain isotope of the sixth element.  
ANSWER: radio**carbon dating** [or **carbon-14 dating** or **C-14 dating**; prompt on dating , radiometric dating, radioactive dating, or radioisotope dating; specifically prompt on answers that mention time measurement but not the element carbon by asking “what is being measured to determine the age/time?”]  
*<Science Earth Science - Rombro>*

16. In one mosque in this city, a Christian workman was executed after carving a giant cross into the massive porphyry flagstone in front of the mihrab. Possibly because the architect of a building in this city misheard the word for “gold” as the word for “six,” that building was built with six minarets, a distinction previously only shared by the Grand Mosque of Mecca. The completion of a building in this city that features the world's first fully developed pendentives prompted the comment “Solomon, I have outdone thee.” The architect Sinan was primarily active in this city, which contains a mosque named for its interior tiles' distinctive blue color. Isidore of Miletus was commissioned to design a building dedicated to the “Holy Wisdom” of God in this city. That building in this city inspired the design of this city's Sulemaniye Mosque. For 10 points, name this city home to the Hagia Sophia.  
ANSWER: **Istanbul** [accept **Constantinople**; accept **Byzantium**]  
*<Arts Architecture - Myers>*

17. In one elegy, a veteran of this war remembers the “homey smell of fall pouring into the blood” in a forest in Oregon before dying in an explosion. “The Body of an American” was written about that veteran of this war. Richard Savage impregnates and abandons a character known only as “daughter” in a novel named for the last year of this war. In the novel *A Fable*, Jesus is reincarnated as a soldier in this war. Another veteran of this war communicates using Morse code after having his face and limbs blown off. After a military defeat in this war, one character escapes to Switzerland in a rowboat with Catherine Barkley. Dalton Trumbo's *Johnny Got his Gun* and John Dos Passos's *Three Soldiers* are set during this war. In another novel, Jake Barnes received the wound that rendered him impotent in this war. For 10 points, name this war, during which Hemingway set *A Farewell to Arms*.  
ANSWER: **World War I** [Accept the **Great War**, **First World War**] (The lead-in is from the closing chapter of *1919*)  
*<Literature American - Myers>*

18. The size distribution of these things changes from -3/2 power-law scaling to -10/3 above the Hinze scale, and their shape is characterized by the Morton and Eötvös **(airt-varsh)** numbers. In 1972, neutral current was first detected by the Gargamelle Collaboration which generated these things within superheated Freon. A second order differential equation describes the variation in radius of these things and includes a far field pressure term scaled by density; that equation is the Rayleigh-Plesset equation. The imploding of these things causes shockwaves and sonoluminescence during cavitation. The principle that charged particles form these things led Donald Glaser to create a “chamber” that uses these things to detect particle events. For 10 points, name these globular objects, typically pockets of gas trapped off in liquids.  
ANSWER: **bubble**s [accept liquid **drop**s until “spherical”]  
*<Science Physics - Etzkorn>*

19. This city sent out one ship without a herald's staff to see if their fleet would be attacked when quarreling with Corcyra over Egesta. A war named for this city ended in the Persian-brokered Peace of Antalcidas. In 146 BC, Lucius Mummius captured and destroyed this city, before it was refounded in 44 BC. The Second Peloponnesian War began after this city sent a fleet against the colony of Epidamnus, thus triggering an Athenian response. This city controlled a greased overland passageway called the *diolkos* that was used for transporting barges. Periander was a Bacchiadic tyrant of this city. Philip of Macedon formed a league of city-states named for this city to more effectively rule Greece. The Isthmian Games were held in this city, where a namesake Canal would later enable navigation around the Peloponneseus. For 10 points, name this city that names an ornate style of column.  
ANSWER: **Corinth**  
*<History European to 1400 - Jankov>*

20. Clark and Watson found that this nomothetic trait is highly positively correlated with surgency. It's not impulsivity, but in a theory created by Jeffrey Alan Gray, persons whose BAS is stronger than their BIS are predisposed to high levels of this trait. It is the alphabetically first trait studied with the namesake inventory of Hans Eysenck, who proposed that low levels of cortical arousal cause high levels of this trait. Babies with low reactivity were found to develop high levels of this trait in a study cited in a book focusing on its opposite by Susan Cain entitled *Quiet*. Dominance and activity are sub-traits of this Big Five factor, which is sometimes called positive emotionality. It is represented by the vowel “E” in both the OCEAN model and the Myers-Briggs system. For 10 points, name this personality trait that manifests as outward-focused behavior, often contrasted with introversion.  
ANSWER: **extroversion** [or **extraversion**; or being an **extrovert** or word forms; or **positive emotion**ality before mention; accept **extroversion**-introversion, but do NOT accept **introversion** by itself]  
*<Social Science Psychology - Smith>*

21. The performance-enhancing drug Meldonium inhibits CRAT, an enzyme that reacts this molecule with carnitine. Some sulfate-reducing bacteria oxidize this molecule to produce carbon dioxide in a reverse form of the Wood-Ljungdahl **(Lyoong-dahl)** pathway. This molecule is synthesized by a three-enzyme complex with E1, E2, and E3 subunits, the first of which requires a thiamine pyrophosphate cofactor. During starvation, thiophorase converts beta-hydroxybutyrate and other ketone bodies into this molecule outside the liver. A thiolase forms carbon-carbon bonds between two units of this molecule in the first step of the mevalonate pathway. Each round of beta oxidation cleaves two carbons from a fatty acid to release this molecule, which also reacts with oxaloacetate to begin the citric acid cycle. For 10 points, name this molecule formed from the oxidation of pyruvate.  
ANSWER: **acetyl-CoA** [or **acetyl coezyme A**]  
*<Science Biology - Narayan>*

**2019 National All-Star Academic Tournament**

**Round 9 – Bonuses**

1. One chapter in this novel was reworked from a short story in which Enoch Emery dresses in a gorilla suit stolen from a man who had earlier told him to “go to Hell.” For 10 points each:  
[10] Name this novel in which Hazel Motes creates the “Church Without Christ” after meeting the street preacher Asa Hawks, who pretends to be blind.  
ANSWER: ***Wise Blood***  
[10] *Wise Blood* is one of two novels written by this author of *The Violent Bear It Away*. This Southern Gothic author is more famous for short stories such as “Everything That Rises Must Converge” and “A Good Man is Hard to Find”  
ANSWER: Flannery **O'Connor**  
[10] In *Wise Blood*, Enoch steals one of these objects to serve as the “new Jesus” of the Church Without Christ. This object is later cradled by Sabbath Lily before Motes angrily destroys it.  
ANSWER: a **mummy** [accept **shriveled man**, **shriveled dwarf**, or other clear equivalents]  
*<Literature American - Tong>*

2. Patrick Radden Keefe's book *Say Nothing* chronicles the kidnapping and murder of Jean McConville in this region. For 10 points each:  
[10] Name this region where groups like the Provisional IRA and Ulster Volunteer Force clashed during The Troubles.  
ANSWER: **Northern Ireland** [reluctantly accept **Ulster**]  
[10] Keefe's book relies in part on an oral history project conducted by Ed Moloney, Anthony McIntyre, and Wilson MacArthur in collaboration with this university's Burns Library. After the researchers published some of those interviews in *Voices from the Grave*, this university was subpoenaed for the remaining tapes.  
ANSWER: **Boston College** [do not accept “Boston University”, prompt on Boston]  
[10] The Boston tapes supposedly implicated this longtime leader of Sinn Féin in McConville's kidnapping, for which he was briefly arrested in 2014. This leader has long claimed, rather implausibly, that he was never a member of the IRA.  
ANSWER: Gerry **Adams** [or Gerard **Adams**; Gearóid Mac **Ádhaimh**]  
*<History European 1914-present - Kothari>*

3. In a novel in this language, a dead schoolteacher called Big Master declares his widow a harlot for marrying Billyboy the Post. For 10 points each:  
[10] Name this original language of a novel whose title is alternately rendered as *Graveyard Clay* or *The Dirty Dust* in two translations released in 2016 by Yale University Press. A book translated as *The Poor Mouth* was also written in this language.  
ANSWER: **Irish** Gaelic language [*Graveyard Clay* is by Máirtin Ó Cadhain]  
[10] *The Poor Mouth* was written by this author under the pseudonym Myles na gCopaleen. He draw on legends about the mad king Sweeney in his metafictional *At Swim-Two-Birds*.  
ANSWER: Flann **O'Brien** [or Brian **O'Nolan**]  
[10] This Irish poet wrote “The Wild Swans at Coole” at Lady Augusta Gregory's estate in County Galway, where the Irish language is still spoken by much of the population today.  
ANSWER: William Butler **Yeats**  
*<Literature British Non-Shakespeare - Kothari>*

4. This leader of the Cooperative Commonwealth Federation used an analogy involving a cream separator that yielded skim milk for workers and cream for bosses to explain his views on class. For 10 points each:  
[10] Name this premier of Saskatchewan, an ex-priest who led North America's first socialist government.  
ANSWER: Tommy **Douglas** [accept Thomas Clement **Douglas**]  
[10] Douglas introduced a plan with this name that instituted universal healthcare in Saskatchewan and would later be copied federally. An American Great Society program with this name would later be expanded under George W. Bush's “Part D” program.  
ANSWER: **Medicare**  
[10] Douglas would later be one of the early leaders of this leftist Canadian party that currently governs British Columbia. This party was led in more recent years by Jack Layton and Jagmeet Singh.  
ANSWER: **N**ew **D**emocratic **P**arty  
*<History World - Myers>*

5. The first European tram system was built in this city, and it is home to the only extant Sephardic Haggadah. For 10 points each:  
[10] Name this city on the Miljacka **(meel-yats-ka)** river, where the first Winter Olympics held in a socialist country were held in 1984.  
ANSWER: **Sarajevo**  
[10] Sarajevo is within this mountain range that extends from Italy through the Balkans. Its highest peak is Maja Jezercë **(mah-yah yeh-zurts-uh)** in Albania.  
ANSWER: **Dinaric Alps** [or **Dinarides**]  
[10] Franz Ferdinand was assassinated on one of these structures over the Miljacka River, which was historically described as “Latin” but was temporarily renamed for Gavrilo Princip. Another Bosnian example of these structures built by the Ottomans crosses the Drina in Visegrad.  
ANSWER: **bridge**s  
*<Geography Europe - Dees>*

6. *Description Acceptable*. This event is referenced in the first ayah of Surah al-Qamar after the Meccans asks for a miracle, which disbelievers consider to be “transient magic.” For 10 points each:  
[10] Cheraman Perumal supposedly witnessed what event before later converting to Islam and being named Thajuddin?  
ANSWER: **splitting** of the **Moon** [accept reasonable descriptions like **cutting** the **Moon** in half]  
[10] Surah al-Qamar tells the stories of Ad, Noah, Thamud, Lot, and Pharaoh while repeatedly asking if anyone will perform this action. The verb used to denote this action refers to devotional acts which can include reciting the names of Allah with a misbaha, or prayer beads.  
ANSWER: **remember**ing [accept **dhikr**; accept synonyms like **memorize**; accept more specific answers like **memorizing the Quran**]  
[10] Scholars like Yusuf Ali have connected the miracle of splitting the moon with this event, during which Qiyamah, or the resurrection of the dead, occurs. This fifth article of faith declares that people will either be sent to Heaven or Hell.  
ANSWER: **Last Judgment** [or **Day of Judgment** or **Yawm ad-Din**]  
*<RMP Non-Christian/Bible Religion - Hijazi>*

7. Solving the linear system “*A* *x* equals *b*” can be surprisingly complicated. For 10 points each:  
[10] One well-known method for solving such systems is Cramer's Rule, which expresses the solutions as ratios of these functions of matrices. This function for a 2-by-2 matrix can be calculated by finding the difference of the products of the diagonals, and if this function is zero, then a matrix is not invertible.  
ANSWER: **determinant**s  
[10] The iterative Gauss-Seidel method for solving linear systems involves writing *A* as the sum of two matrices that each have this property. If *A* has this property, the equation “*A* *x* equals *b*” can be solved relatively easily via either back-substitution or forward-substitution, and LU decomposition expresses a matrix as the product of two matrices each with this property.  
ANSWER: **triangular** [accept **upper triangular** or **lower triangular**]  
[10] Provided a solution exists, it is unique if and only if this space is zero-dimensional. For any matrix, the dimension of this space plus the dimension of the image space is equal to the dimension of the domain space.  
ANSWER: **kernel** [or **null** space; or **ker** A; do not accept or prompt on “nullity”]  
*<Science Math - Morrison>*

8. Hilda Ellis Davidson has compared descriptions of this horse to an Indian funeral dirge about the horse “Bagri Maro.” For 10 points each:  
[10] Name this steed who features in many Norse myths. In the same text, Davidson suggested that this horse's eight legs are metaphorical for funeral biers carried by four people.  
ANSWER: **Sleipnir**  
[10] Sleipnir was born as a result of Loki's attempt to stop an unnamed stranger and Svadilfari from completing this structure. Completing this structure on time would have resulted in the Asgardians losing Freyja, the sun, and the moon.  
ANSWER: **walls** of **Asgard** [prompt on just walls]  
[10] In the *Prose Edda*, this son of Odin rides Sleipnir to see the goddess Hel and ask her to release Baldr from the underworld. Hel tells this god that she will only do so if all creatures will weep for Balder.  
ANSWER: **Hermod** the Brave [or **Hermodr**]  
*<RMP Non-Greek/Roman Myth - Husar>*

9. This singer prompted a namesake “debate” on account of her “great ugly voice.” For 10 points each:  
[10] Name this American-born soprano. Her technical skill despite poor timbre was often compared to her supposed rival Renata Tebaldi's more classically aesthetic voice.  
ANSWER: Maria **Callas**  
[10] One of Callas's best-known roles was as the title character of this opera, who sings “Casta Diva” to the moon. This opera, originally subtitled “The Infanticide,” is titled for a druidess conflicted over her love for Pollione.  
ANSWER: ***Norma***  
[10] Callas led a revival of the bravura operas of this era. This period of Italian opera, which includes works by Bellini and Donizetti, is named for the extensive use of *messa di voce* **(MEH-sah di VOH-chay)**, many kinds of portamentos, and other “beautiful singing” techniques.  
ANSWER: ***bel canto*** era  
*<Arts Opera - Smith>*

10. Enolates can react with esters in the Claisen condensation to form this type of bond. For 10 points each:  
[10] Name this type of bond. Grignard reagents will form this type of bond when reacting with aldehydes or ketones, as will organolithium reagents.  
ANSWER: **carbon-carbon** bond [prompt on “covalent” bond]  
[10] This *trans*-selective reaction forms a new carbon-carbon bond between alkenyl halides and alkenes. The oxyarylation version of this reaction will form a product containing a dihydrofuran, and this reaction normally employs a phosphine ligand.  
ANSWER: **Heck** Reaction [or **Mizoroki-Heck** Reaction]  
[10] The Heck reaction employs a catalytic cycle in which this metal shifts between its 0 and 2 oxidation states. Complexes containing this metal are also frequently used as catalysts in the Negishi and Stille coupling reactions.  
ANSWER: **palladium** [or **Pd**]  
*<Science Chemistry - Husar>*

11. A novel from this modern-day country written 20 years before *Animal Farm* depicts farm animals overthrowing the farmers to introduce 'equality', only for the revolt to degenerate into terror. For 10 points each:  
[10] Name this modern-day country, whose first Nobel Laureate wrote a four-volume epic novel titled *Peasants*. That author was part of decadent movement named “Young [this country]”.  
ANSWER: **Poland**  
[10] The author of *Peasants*, Wladyslaw Reymont, also wrote a sceptically-received late novel titled for one of these creatures. One of these creatures is the title character of Bram Stoker's novel *Dracula*.  
ANSWER: **vampire** [accept *Der* ***Vampir***]  
[10] This other Polish author wrote another multi-volume historical series beginning with *With Fire and Sword*, simply known as *The Trilogy*. His best-known work, *Quo Vadis?*, centers on the Roman Marcus Vinicius amid the rise of Christianity.  
ANSWER: Henryk **Sienkiewicz**  
*<Literature European - Krol>*

12. Identify the following about the recently opened Museum of the American Revolution, for 10 points each.  
[10] The centerpiece of the museum is George Washington's war tent, which was likely made for him when he was enduring the winter in this Pennsylvania town in early 1778.  
ANSWER: **Valley Forge**  
[10] The museum contains a replica of the “new constellation” flag that flew over Washington's war headquarters. The flag was later brought into space by this man, who later served as a Senator from Ohio.  
ANSWER: John **Glenn** [or John Herschel **Glenn**, Jr.]  
[10] This Native American tribe were major backers of the museum. George Washington delivered a 1778 speech commending this tribe for helping recover Boston and Philadelphia, and they were granted autonomy by the 1794 Treaty of Canandaigua.  
ANSWER: **Oneida** Indian Nation  
*<History American (pre-1865) - Bentley>*

13. These entities are essentially conventions that eliminate the degrees of freedom that arise when a system's Lagrangian has a Lie group symmetry. For 10 points each:  
[10] Name these entities, which generally refer to a choice made given a freedom in how potentials are defined in a physical theory. One of these entities named for Ludvig Lorenz enforces the condition that the four-derivative of the vector potential is zero.  
ANSWER: **gauge**s [or **gauge** fixing, or choosing a **gauge**, or **gauge** transformations]  
[10] The coulomb gauge enforces that this operation on the vector potential equals zero.  
ANSWER: **Divergence** [accept **del dot**; don’t accept or prompt on partial answer]  
[10] The curl of the vector potential sources the field for ths force which is also calculated using the Biot-Savart law. Unlike a related force, no monopoles have been discovered that source fields related to this force.  
ANSWER: **Magnetic** force [accept **magnetism**]  
*<Science Physics - Krol>*

14. The background of this painting consists only of a solid black sky over a solid brown hill. For 10 points each:  
[10] Name this painting. In a preparatory sketch for this painting, one object is given a speech-bubble saying “You know, I don't give a damn” in response to a crying animal.  
ANSWER: ***Dog Barking at the Moon*** [or ***Chien aboyant à la lune***, or ***Perro ladrando a la luna***]  
[10] *Dog Barking at the Moon* was inspired by a folktale from this region, its artist's homeland. A farm in this region inspired a painting that includes an eye and an ear attached to a tree, *The Tilled Field*.  
ANSWER: **Catalonia** [or **Catalunya**, or **Cataluña**, prompt on Spain or España]  
[10] Joan Miró drew upon Catalonia for his paintings *Dog Barking at the Moon* and *The Tilled Field*, much like this other Spanish Surrealist who took part of the Catalonian landscape for the background of his *The Persistence of Memory*.  
ANSWER: Salvador **Dalí** [or Salvador Domingo Felipe Jacinto **Dalí** i Domènech]  
*<Arts Painting - French>*

15. In one work, this thinker outlined the reasons that he considered the sublime and the beautiful to be distinct rational categories, most notably because the sublime possesses a causal structure while the beautiful does not. For 10 points each:  
[10] Name this British philosopher, the author or *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful*. This thinker's argument for gradual change instead of revolution was the target of Mary Wollstonecraft's *Vindication of the Rights of Man*.  
ANSWER: Edmund **Burke**  
[10] Edmund Burke is often called the “father of” this political ideology. Backers of this ideology tend to argue for the maintenance of traditional institutions and skepticism of abstract political reasoning. This ideology names the political party of Margaret Thatcher and Theresa May.  
ANSWER: **Conservatism** [accept word forms]  
[10] Burke greatly influenced this later conservative thinker who argued against utopian planning in works such as *On Human Conduct*. This thinker listed items such as “preferring present laughter to utopian bliss” as qualities of the title people in his essay “On Being Conservative.”  
ANSWER: Michael Joseph **Oakeshott**  
*<RMP Philosophy/Thought - McLain>*

16. This sect produces devotional songs called *qawwali*. For 10 points each:  
[10] Name this sect. An improvisatory flute solo called a *taksim* is part of its *sama* ceremony, which features a whirling dance.  
ANSWER: **Sufi**sm [or **Sufi**s, accept **Mevlevi** order, whirling **dervish**es, prompt on Sunni Islam]  
[10] This genre of Islamic music is usually performed a cappella or with some percussion, because ahadith prohibit most instruments. The Islamic State's “Dalat al-Islam Qamat” is a song in this *halal* genre.  
ANSWER: **nasheed**s [or **anasheed**; or **nasyid**; or **neşid**]  
[10] The heptatonic *maqamat* on which Arabic music is based have this unusual feature, which is shared by the best-known pieces of Giacinto Scelsi. Western composers like Lou Harrison were inspired to write compositions with this feature by *Genesis of a New Music*, a book by Harry Partch.  
ANSWER: they are **microtonal** [or they contain **microtones** or **quarter tones**; accept anything that mentions having **smaller invertals** or **more tones** than typical Western music]  
*<Arts Music - Smith>*

17. Secretions of histamine from nearby enterochromaffin-like cells bind to H2 receptors and stimulate activity in these cells. For 10 points each:  
[10] Name these cells whose hydrogen potassium ATPase enzymes are the target of proton pump inhibitors.  
ANSWER: **parietal** cells  
[10] Parietal cells secrete hydrochloric acid to maintain the acidity of this organ, so that food can be properly digested before entering the small intestine.  
ANSWER: **stomach**  
[10] Another secretion of parietal cells is this glycoprotein, which takes vitamin B12 from haptocorrin and transports it through the small intestine.  
ANSWER: gastric **intrinsic factor** [prompt on IF or GIF]  
*<Science Biology - Shanmugam>*

18. In one novel about people of this ethnicity, the siblings Mozasu and Noa run the title gaming establishments and the central family emigrates after a local crime boss conceives Noa during an extramarital affair. For 10 points each:  
[10] Name this ethnicity of Takao, the hero of *Outcries*, as well as of the inhabitants of a settlement that S dies attacking, who include a shopkeeper whose supermarket is looted by a band of soccer-playing youth.  
ANSWER: **Korean**-Japanese [accept **Chōsenjin**, **Hanmin**jok]  
[10] The grocery store-owning Emperor appears in this novel in which Takashi shoots himself and the Emperor destroys Mitsusaburo's shop before he leaves on a wildlife expedition to Africa.  
ANSWER: *The* ***Silent Cry*** [accept ***Man'en Gannen no Futtoboru***, ***Football on the First Day of Man'en***]  
[10] *The Silent Cry* and *Outcries* were written by this Japanese Nobel laureate who also wrote novels including *A Personal Matter* and *Nip the Buds, Shoot the Kids*.  
ANSWER: Kenzaburō **Ōe**  
*<Literature World - Myers>*

19. In the majority opinion for *Gideon v Wainwright*, Hugo Black declared it an “obvious truth” that any given person “cannot be assured of a fair trial unless counsel is provided for him” since the US criminal justice operates in this sort of legal system. For 10 points each:  
[10] Name this type of court system in which two sides present their case before an impartial judge or jury. It is contrasted with the inquisitorial system common in civil law jurisdictions.  
ANSWER: **adversarial** system [or **adversary** system]  
[10] Civil law is contrasted with this system, one variant of which is named for England, in which disputes over law are resolved by referring to precedent.  
ANSWER: **common** law [prompt on case law]  
[10] Adversarial systems often define the standard of proof with reference to reasonable doubt, as justified by this man's statement “It is better that ten guilty persons escape than that one innocent suffer.” That ratio appears in this scholar's *Commentaries on the Laws of England*.  
ANSWER: William **Blackstone**  
*<Social Science Misc - Smith>*

20. One biography of this man describes how, motivated by a theory that African-Americans hated cold water, he kept swimming pools in black neighborhoods significantly colder than white ones. For 10 points each,  
[10] Name this man who created a secretive branch of government called “triborough” accountable only to himself and enjoyed almost completely free rein as an urban planner, as chronicled in the biography *The Power Broker*.  
ANSWER: Robert **Moses**  
[10] *The Power Broker* was written by Robert Caro, who has won two National Book Awards for his biography series of this president, one of whose volumes is titled *All the Way* in an echo of one of this president's campaign slogans.  
ANSWER: **L**yndon Baines **Johnson** [accept **LBJ**, prompt on Johnson]  
[10] A rare challenge to Robert Moses's power came when this pioneering urban planning theorist and author of *The Death and Life of Great American Cities* organized Greenwich **(Gren-itch)** Village residents to prevent the construction of an expressway there.  
ANSWER: Jane **Jacobs**  
*<History American (1945-present) - Myers>*

21. The King Marko Krajlevic **(Cry-ev-each)** was mythologized to have a 300 year lifespan and to have confronted the Ottoman Turks during their occupation of his home country. For ten points each:  
[10] Marko Krajlevic is part of the mythological folklore and epic poetry of this country, where the city Belgrade lies on the banks of the Danube.  
ANSWER: **Serbia**  
[10] One of the heroes that accompanied Marko in epic poetry was Miloš Obilić **(MEE-lohsh AW-beel-each)** who supposedly snuck into this sultan's tent and assassinated him. This sultan conquered Adrianople, renamed it Edirne, and moved the capital of the Ottoman Empire there.  
ANSWER: **Murad I** [accept **Hüdavendigar**]  
[10] This 1389 Battle was the site of a confrontation between the Serbian nobleman Vuk Brankovic and the Ottoman Sultan Murad I. Although the result of this battle was tactically inconclusive, both sides lost so many men that it was devastating for the less populous Serbs.  
ANSWER: Battle of **Kosovo**  
*<History European to 1400 - Jankov>*